TRANSPORTATION OPTIMIZATION

Transportation optimization helps shippers, 3PLs, and transportation consultants analyze shipments, rates, and constraints to produce realistic load plans that reduce overall freight spend.

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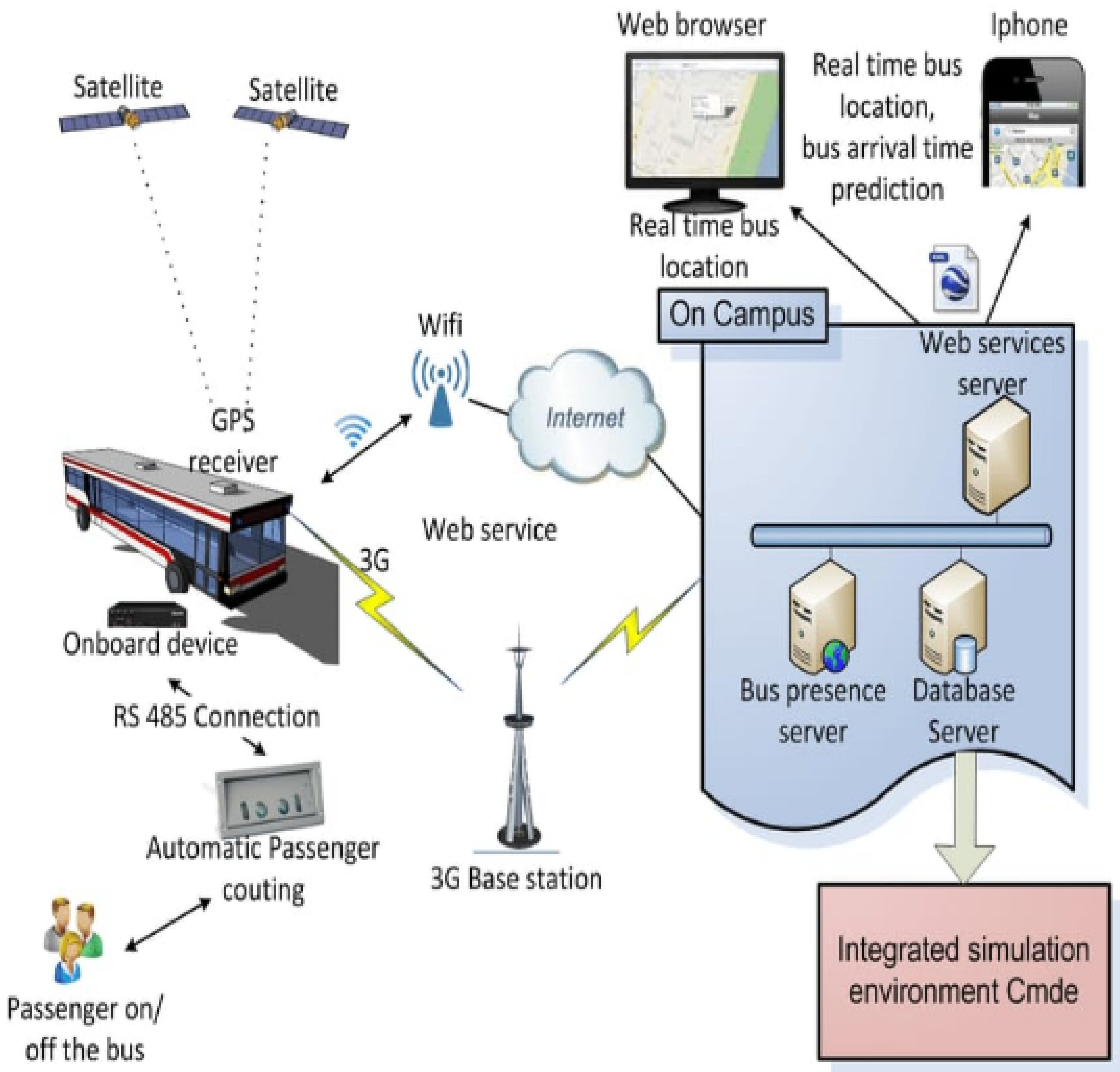
Transport optimization definition:

TRANSPORTATION OPTIMIZATION is the process of analyzing shipments, rates and Constraints to produce realistic load plans that reduce overall freight spend and gain Efficiencies across entire transportation networks.



Strategies:

WHAT STRATEGIES MAKES SENSE FOR YOUR SHIPMENTS TO BE OPTIMIZED

Smarter | Stronger | Faster | Better

⇨ Consolidation	Aggregating multiple shipments potentially across clients : example LTL to TL
⇨ Multi-point optimization	Build multi stop route with multi pick/ multi drop
⇨ Zone skipping	Consolidate individual packages to TL/LTL and send to distribution/sorting facility closer to destination
⇨ Pooling	Optimal selection of warehouse/cross docks to leverage consolidation and deconsolidation
⇨ Continuous moves	Stringing loads together, so that the carrier can better utilize a particular truck or asset
⇨ Backhauls	Reduce empty miles and increase asset utilization

SENSOR REQUIRED:

***Fuel level measurement sensor**

***Fuel flow meters**

***Torque sensor**

***Air monitoring sensor**

***Speed measurement sensor**

GOALS:

1.Reduced Traffic congestion:

*By helping users find the quickest routes and avoid traffic congestion,machine learning models contribute to reducing overall traffic congestion

In urban areas.

*This can lead to shorter commute times,reduced fuel consumption,and lower emission.

2.Traffic Management

*City traffic management authorities can use machine learning models to optimize traffic signals timings and reduce traffic bottlenecks,improving overall mobility.

3.Cost Efficiency

* Optimize routes to minimize fuel consumption and travel time,which can be critical for logistic and transportation companies looking to reduce operational costs.

4.Privacy and security

*Implement robust privacy measures to protect user data,including their locations,ensure that data is stored and transmitter securely.

ALGORITHM:

STEP 1:Railway traffic control targeting passenger flows

STEP 2:Industrial issues for Mass Transit Operations

STEP 3:Public Transport in Emergency Planning

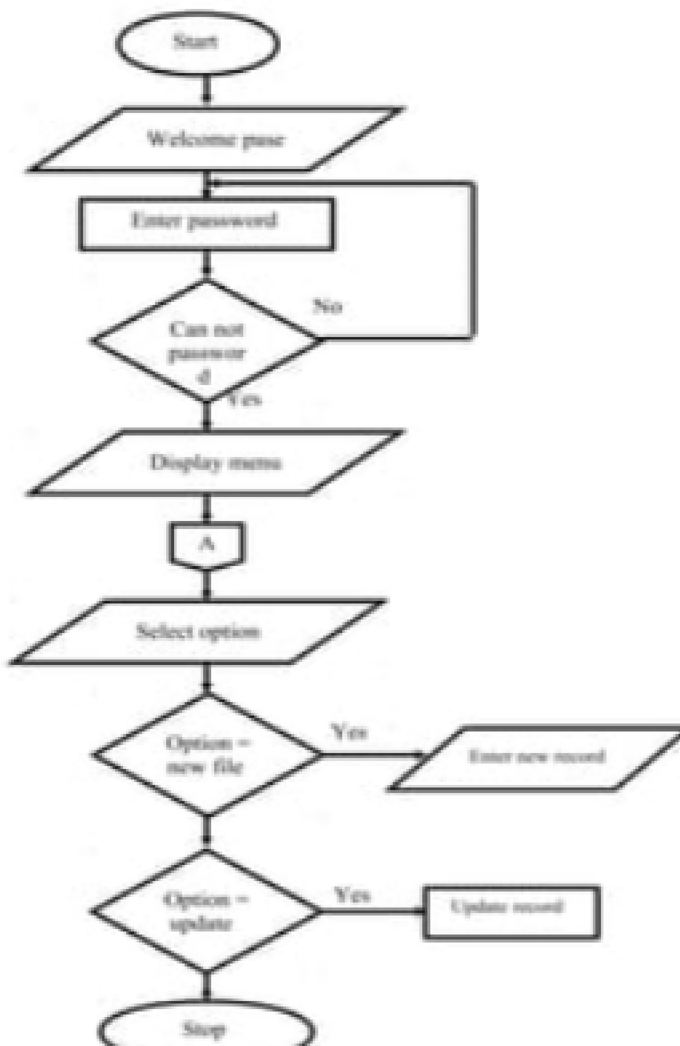
STEP 4:Computing and Improving Passenger Punctuality

STEP 5:Dealing with uncertainty in railway traffic management and Disruption management

STEP 6:Rolling stock planning and challenges

FLOWCHART:

4.9 PROGRAM FLOW CHART



Program 1:

```
# Creates a list of all the supply nodes

Warehouses = ["A", "B", "C"]



# Creates a dictionary for the number of units of supply for each supply node

Supply = {"A": 300, "B": 600, "C":600}



# Creates a list of all demand nodes

Projects = ["1", "2", "3"]



# Creates a dictionary for the number of units of demand for each demand node

Demand = {

    "1": 150,

    "2": 450,

    "3": 900,

}
```

```
# Creates a list of costs of each transportation path

Costs = [  # Projects

    [5,1,9],  # A   warehouses

    [4,2,8],  # B

    [8,7,2]   # C

]


# The cost data is made into a dictionary

Costs = makeDict([warehouses, projects], costs, 0)
```

OUTPUT:

```
Route_A_1 = 0.0

Route_A_2 = 300.0

Route_A_3 = 0.0

Route_B_1 = 150.0

Route_B_2 = 150.0

Route_B_3 = 300.0

Route_C_1 = 0.0

Route_C_2 = 0.0

Route_C_3 = 600.0

Value of Objective Function =  4800.0
```

PROGRAM 2:

```
// C program to find minimum number of platforms required
on

// a railway station

 // Importing the required header files

#include <stdio.h>

 // Creating MACRO for finding the maximum number

#define max(x, y) (((x) > (y)) ? (x) : (y))

 // Function to find the minimum number of platforms

// required

Int findPlatform(int arr[], int dep[], int n)

{

   // plat_needed indicates number of platforms

  // needed at a time

  Int plat_needed = 1, result = 1;

 // Run a nested for-loop to find the overlap

  For (int I = 0; I < n; i++) {

  // Initially one platform is needed

     Plat_needed = 1;
```

```
For (int j = 0; j < n; j++)

If (I != j

// Increment plat_needed when there is an

// overlap

If (arr[i] >= arr[j] && dep[j] >= arr[i])

Plat_needed++;

}

// Update the result

Result = max(plat_needed, result);

}

Return result;

}

// Driver Code

Int main()

{

// Train 1 => Arrival : 01:00, Departure : 09:00

// Train 2 => Arrival : 03:00, Departure : 04:00

// Train 3 => Arrival : 05:00, Departure : 06:00

Int arr[] = { 100, 300, 500 };

Int dep[] = { 900, 400, 600 };
```

```
Return 0;

}
```

OUTPUT:

2

PROGRAM 3:

```
// C++ program to implement the above approach

#include <bits/stdc++.h>

Using namespace std;

// Function to find the minimum number

// of platforms required

Int findPlatform(int arr[], int dep[], int n)

{

    // Store the arrival and departure time

    Vector<pair<int, int> > arr2(n);

    For (int I = 0; I < n; i++) {

        Arr2[i] = { arr[i], dep[i] };

}
```

```
    // Sort arr2 based on arrival time

    Sort(arr2.begin(), arr2.end());

    Priority_queue<int, vector<int>, greater<int> > p;

    Int count = 1;

    p.push(arr2[0].second);

    for (int I = 1; I < n; i++) {

        // Check if arrival time of current train

        // is less than or equals to departure time

        // of previous train

        If (p.top() >= arr2[i].first) {

            Count++;

        }

        Else {

            p.pop();

        }

        p.push(arr2[i].second);

    }

    // Return the number of trains required

    Return count;

}

// Driver Code
```

```
    // Return the number of trains required

    Return count;

}

// Driver Code

Int main()

{

    Int arr[] = { 900, 940, 950, 1100, 1500, 1800 };

    Int dep[] = { 910, 1200, 1120, 1130, 1900, 2000 };

    Int n = sizeof(arr) / sizeof(arr[0]);

    Cout << findPlatform(arr, dep, n);

    Return 0;

}
```

OUTPUT:

3


thank
you